How do the Asian Economies Compete with Japan in the US Market? Is China Exceptional? A Triangular Trade Approach

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[Abstract]

We explore how Japanese exports and foreign direct investment (FDI) to China affect Chinese exports to the US market. Moreover, in order to shed light on the possible peculiarity of Chinese trade behavior, we apply this trilateral trade approach to seven other East Asian countries and examine the effect of Japanese trade and FDI on these countries' exports to the US. Our empirical results suggest that while Chinese and Japanese exports are directly competitive in US markets, Chinese exports to the US appear to be promoted partly by Japanese exports to China. However, when we control for Japan's FDI to China, the trade enhancing effect of Japanese exports disappears, suggesting that the positive correlation between Japanese exports to China and Chinese exports to the US can be explained by vertical trade between Japanese multinationals and their affiliates in China. Our results also show that Indonesian and Philippine exports are also competing with Japanese exports in US markets. However, the extent of the competition is found to be much higher for China than for these countries.

Key Words: China, Foreign Direct Investment, Japan, Trade, Triangular Trade Approach.

JEL Classification: F14, F23

1. Introduction

In the last two decades, international trade with China has expanded rapidly while the Chinese economy experienced an unprecedented high growth. Between 1992 and 2000, Chinese exports almost tripled from $84.9 billion to $249 billion, as did Chinese imports (from $80.6 billion to $225 billion). With the accession to the WTO in 2001, China's trade is expected to experience an even higher growth in the years to come.

China's significant presence in the world trade has also given a rise to new trade disputes with trading partners, especially the United States. China is not only condemned for threatening trading partners' industries with its mighty exports, but also for its currency policy which allegedly maintains Chinese renminbi at an artificially low value to help its exports. The recent protectionist debate in the US Congress about whether to impose restrictions on textile imports from China, unless the latter alters its exchange rate policy, exemplifies political concerns over a loss of manufacturing jobs in US industries due to rising manufacturing imports from China.[1]

To many, these trade issues between the US and China are reminiscent of the trade conflicts between the US and Japan that lasted until recently. For decades, both academic and policy making circles intensely debated on foreign access to Japanese markets as well as Japanese exporters' allegedly "unfair" trade practices in textile, automobile, and semiconductors, among many others, that were claimed to have hurt US industries. The intensity of the bilateral trade disputes waned in the last decade, partly due to the decade-long recession in Japan, and more importantly, to the emergence of China as the world exporter.[2]

Trade conflicts between countries could change their forms and players as the tide in foreign direct investment changes its direction. For example, a decrease in the exports of a country might merely be a reflection of global production shift by the country's multinational corporations. Although we witness the "threat" of Japanese exports diminishing, and the threat of Chinese exports rising, some portion of Chinese exports to the US may include products made by Japanese affiliates in China (which appear with the label "made in China" instead of "made in Japan"). In fact, Japan's

[1] See *The Economist's* articles, "What do yuant from us?," May 18, 2005 and "Putting up the barricades," April 21, 2005 as well as the US Congressional Budget Office's testimony on April 14, 2005. A list of other manufacturing products under debates between the two countries includes bedroom furniture, television sets, handbags, and handcarts among many others.

[2] For example, between 1999 and 2003, there is only one trade dispute case against Japan, brought by the US, to the WTO dispute settlement mechanism.

Ministry of Finance reported that the number of new outflow foreign direct investment (FDI) cases by Japanese firms to China exceeded those to the US in 1994, 1995 and 2002.

For China, unquestionably, the US and Japan are the most important trading partners besides Hong Kong, and their importance is increasing especially for the recent years. Before China started liberalizing its economy, Hong Kong played the important role as a middleman between China and the rest of the world; in 1992, Hong Kong was China's biggest trading partner in both exports and imports (in terms of traded values; see Table 1).[3] For the recent years, with its economic liberalization efforts, China started trading more directly with the rest of the world while Hong Kong's role as a middleman dwindled. Nonetheless, if we assume the indirect trade flows via Hong Kong to China are proportional to the direct trade flows to China, we could say that the US and Japan have been the two largest trading partners in both exports and imports during the last decade. Between 1992 and 2000, China's imports from Japan tripled from $13.7 billion to $41.5 billion while the imports from the US more than doubled from $8.9 billion to $22.4 billion (Table 1). During the same period, China's exports to Japan increased almost four-fold from $11.7 billion to $41.6 billion, and its exports to the US rose more than six-fold from $8.6 billion to $52.1 billion.

In this study, we investigate the dynamics of the trilateral trade relationship between China, Japan and the US. In what we call the "triangular trade approach," we explore how Japanese trade with and foreign direct investment in China affect Chinese exports to the US market. Moreover, in order to shed light on the possible peculiarity of Chinese trade, we apply the trilateral trade approach to seven other East Asian countries and examine the effect of Japanese trade and FDI on these countries' exports to the US.[4] For the reminder of the paper, we refer to these countries and China as "third countries" for convenience.

In the triangular trade approach, we regress the exports of the third countries to the US on the Japanese exports to the US as well as those to the third countries in a panel data specification while controlling for Japanese FDI and other macroeconomic variables. With this approach, we can reveal whether Japanese exports to the US and those to China (or other third countries) are substitutes or complements. By incorporating Japanese firms' FDI activities, we can also examine if Japanese multinational corporations are shifting their production bases to China (or other third

[3] See Fung and Iizaka (1998) for a detailed description on Hong Kong's role as a middleman of US and Japanese exports to China.

[4] These countries are Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, and Thailand.

countries in East Asia) and how that affects the exports from China (or other third countries) to the US.

One of this study's contributions is that we examine bilateral trade flows in a three-country framework. Most of the past empirical works on international trade consider bilateral trade in a two-country framework. However, we think that empirical studies with a two-country framework, most notably gravity models, ignore an important trade determinant, that is, the influence of a third country's trade flows.

Our main empirical results are as follows. First, we find that Japanese exports to China seems to promote Chinese exports to the US. However, after controlling for Japan's FDI to China, the trade enhancing effect of Japanese exports disappears, indicating that Chinese exports to the US are promoted partly by Japanese firms' efforts to shift their production bases to China. We do not find this relationship in other East Asian countries. Second, when controlling for the US market size for each commodity, we find that the exports from some of our sample Asian countries and Japanese exports are competing in the US market. However, the degree of the competition is higher for China than other Asian countries.

The rest of the paper is organized as follows. Section 2 reviews the trade/FDI nexus between Asian countries, Japan, and the US. Section 3 presents theoretical backgrounds for our triangular trade approach. In section 4, we describe our data set. In section 5, we discuss the estimation results from the basic model. Section 6 reports the estimation results with a model that controls for Japanese FDI as well as US total imports. We conclude in section 7.

2. The economic linkage among the Asian economies: the trade-FDI nexus

As has been well-documented, the US and Japan have been the most important trading partners for the East Asian economies for decades. Table 2 presents the shares of Japan and the US in the trade of the East Asian countries between 1990 and 2000. The table shows that the US has been an important destination for Asian exports while Japan is an important exporter to these countries. The share of the US as the export destination ranges from 14 percent (Indonesia) to 30 percent (Philippines), while that of Japan as the import source country varies from 16 percent (Indonesia) to 25 percent (Thailand). From these data, we can make a generalization that Japan exports to East Asia while the latter exports to the US.

Between 1985 and 1997, the exports from East Asia marked a steady, five-fold increase (before declining in 1998 due to the Asian financial crisis), raising the share of exports in world total from 9 percent in 1980-85 to 18 percent in 1997 (see Kawai,

2004). At the same time, FDI inflows are expanding in East Asia hand-in-hand with trade. The share of FDI inflows to East Asia in world total increased from eight percent in 1985 to 22 percent in the mid-1990s, though it declined to nine percent in 2002.

The FDI to the Asian economies not only enlarged the exporting capacity, but also changed the trade structure of the region. As Fukao, et al. (2003) document, intra-industry trade increased for the past decades, following an increase in vertical FDI by US and Japanese multinational corporations. These multinationals relocated segments of production rather than entire industries, depending on each FDI recipient country's comparative advantage (Hill and Athukorala, 1998). Hence, trade expansion in East Asia inevitably involved a rise in intra-industry trade. Athukorala (2003) documents that expansion in fragmented trade is the most evident in the East Asian region, more so than in Europe or North America.

Japan's role as an FDI provider has been also increasing its importance in the region. Table 3 reports Japanese FDI (in terms of both its value and number of cases) in East Asia for the period between 1989 and 2002. The total value of Japanese direct investment flows to China, starting from a level slightly above the Philippines in 1989, hit its peak in 1995, exceeding far beyond twofold of those of other Asian countries. In terms of FDI cases, the growth of Japan's FDI to China is even more striking; in 1995, 27 percent of Japanese total FDI is directed to China. Unquestionably, China has been the major recipient of Japanese FDI in the Asian region during the last decade.

Many researchers have investigated the trade-FDI nexus in the region, and claimed that the relationship has been bidirectional. That is, the Asian economies that implemented policies to create a friendly environment for FDI have been able to transform their industrial structures toward more export-oriented ones. Export expansion, in return, has had positive feedback effects and facilitated further liberalization of goods and financial trade. Financial liberalization has enabled countries to receive more FDI inflows. Petri (1995) presents empirical evidence in both the macro and the firm levels for this bidirectional relationship. Petri (1992) finds Japanese firms' FDI to Thailand enhanced trade between the two countries as well as trade between these two countries and the rest of the world, while Lee (1994) and Lin (1996) present evidence that the FDI from the home countries, Korea and Taiwan, respectively, promote only the bilateral trade volumes. Moreover, Kawai and Urata (1998) find a complementary relationship between Japan's exports and FDI to East Asia in food, textiles, chemical products, general machinery, and electronic machinery industries, while they also find that exports and FDI exhibit a strong negative

relationship in wood and pulp industries. Dobson and Chia (1997), investigating intra-firm trade in East Asia, conclude that intra-firm trade tends to diminish as the host country's economy matures. They find that, as the host country develops and its domestic purchasing power rises, the direction of FDI shifts toward more sophisticated, or end-user type of products such as consumer durables.

We must make one important note, however, that most of the empirical studies on the trade-FDI nexus are focusing on bilateral trade and FDI flows by heavily relying on the gravity model. Our study, on the other hand, examines the dynamics of the trade-FDI nexus in a three country frame work.

3. Triangular Trade Approach and Related Literature

When considering how to sell products in a foreign market, a multinational firm can choose whether to export the products directly from its home country, or produce them in the foreign market through its foreign subsidiaries. In the empirical trade literature, many researchers have attempted to answer the question of whether foreign production (i.e., FDI) and exports are substitutes or complements.[5] Yamawaki (1991), Clausing (2000), and Head and Ries (2001) find that a complimentary relationship exists between foreign production and exports, whereas Belderbos and Sleuwaegen (1998) find that Japanese FDI and exports are substitutes only when the intention of FDI is to avoid antidumping tariffs in Europe. Blonigen (2001), using product-level data, finds FDI and exports are substitutes when FDI is horizontal. However, these studies only focus on the relationship between outward FDI flows and exports.

Our framework is closer to Zhang and Felmingham (2001) who investigate the causal relationship between inward FDI to China and Chinese exports. Using data from both national and provincial levels, they confirm that the causal relationship is bidirectional. Especially for the causality from inward FDI flows to exports, they argue that foreign investors who have superior knowledge on world market conditions tend to export their products from the host country. In any case, these previous researches only looked at trade-FDI relationships between two countries.

In this paper we extend the investigation on the FDI-trade relationship to a three-country framework. Given the recent trends in international trade which involve

[5] More recent development in the literature can be also found in Helpman, et al. (2004) who find that the heterogeneity of firms in the industry is also an important determinant for the choice between exporting and foreign production through FDI.

a quite deal of intra-firm or intra-industry trade and FDI flows, we think that investigating the dynamics of trade in the conventional bilateral framework is not sufficient. In order to examine the dynamics of trade between China and the US, we must incorporate the effects of third factors such as trade flows and FDI flows between China and other countries (than the US). In what follows, we attempt to generalize the complex trilateral trade and FDI relationship, often called the "export-platform FDI".[6,7]

3-1. FDI and Trade in a Three-Country Framework

A. Export-platform FDI: Vertical Foreign Direct Investment

Let us consider the trade-FDI dynamics of one commodity among three countries: the US, Japan, and a third country which we call China for now. For the sake of brevity, we assume that the US provides a market for the commodity, and that Japan has a multinational firm that produces the commodity. The multinational firm may involve two firms for the production of the commodity: an upstream firm, U, and a downstream firm, D, while the former supplies intermediate goods to the latter and the latter sells the final product to the US market. If both downstream and upstream firms are established in Japan, the product will be exported directly from Japan to the US. The trade dynamics of this first, base case are shown in Figure 1.a. Arrows in the figure represent the flows of goods. In this case international trade flows are purely bilateral between the US and Japan, and involve no foreign production or FDI by the Japanese multinational.

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[6] We thank an anonymous referee for bringing our attention to the export-platform FDI argument.

[7] The seminal theoretical work in this literature is Motta and Norman (1996) who investigate various patterns of investment strategies by multinational firms by applying game theory in a three-country framework. Other important works include Neary (2002), Yeaple (2003), Ekholm et al. (2003) and Grossman et al. (2003). The studies, however, focus on describing equilibrium regimes for different set of parameter ranges, but fail to discuss the dynamics of trade and FDI flows in our context.

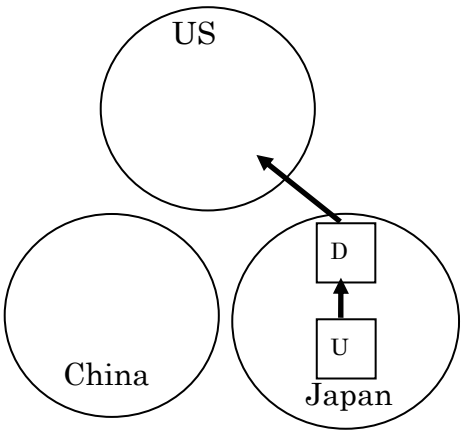

Figure 1.a : trade flows prior to FDI

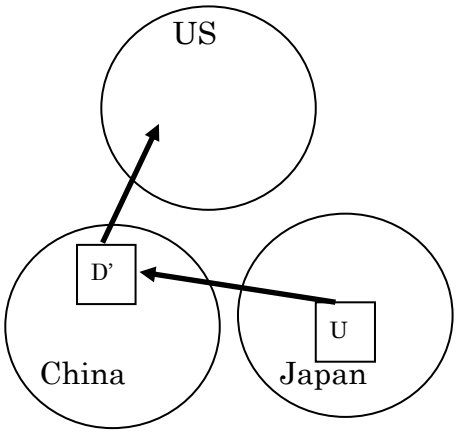

Figure 1.b: trade flows after vertical FDI for down stream firm is made

Now, we consider a next case where the Japanese multinational makes vertical FDI.[8] The Japanese multinational firm fragments its production by establishing a downstream firm D' in China as a vertical FDI, and exports the product from there. This case is depicted in Figure 1.b. We assume for simplicity that the domestic downstream plant D is shut down once the Japanese-affiliated plant D' is established in China, and therefore that all of the exports come from D'. This case leads to three changes in the trade flows among the three countries. First, Japanese exports to the US stop because of the shut-down of the domestic plant D. Second, Japanese exports to China arise because of intra-firm trade between the parent firm U and its foreign affiliate D'. Third, Chinese exports to the US emerge because the Japanese downstream plant in China starts shipping the product to the US.

In reality, a trilateral relationship is not as clear-cut as is shown above. However, we can generally predict that if Japanese firms are shifting their production to China through vertical FDI, Japanese exports to the US would decrease while both Japanese exports to China and Chinese exports to the US increase. Thus, when vertical FDI is made, while Japanese exports of a certain product are observed to be decreasing, Japanese producers may be still exporting the same product to the US, but by passing through China.

[8] We can also consider the case in which the multinational firm shifts its upstream firm to the local market. However, this case does not alter the nature of the existing trade flows.

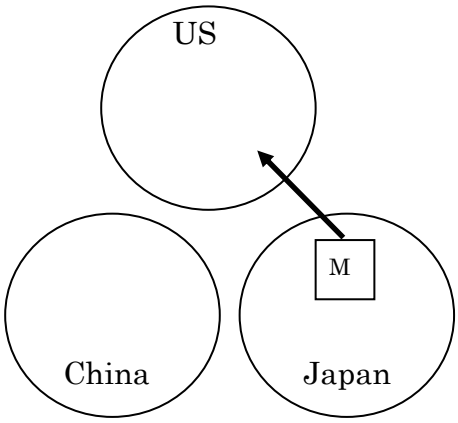

Figure 2.a: trade flows prior to FDI

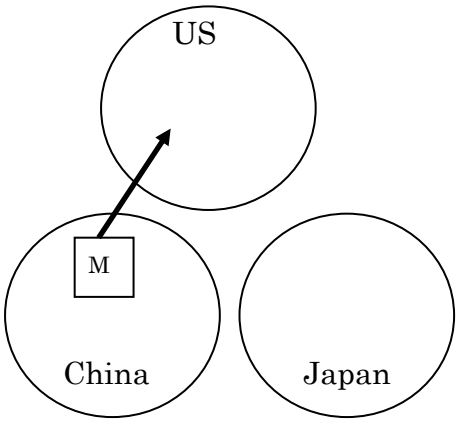

Figure 2.b: trade flows after non-fragmentation FDI

B. Export-platform FDI: Non-fragmentation

The next case is one where the Japanese multinational makes export- platform FDI without fragmentation of production process. Figure 2.a depicts the base model for this case in which the Japanese multinational, M, exports its product directly to the US. However, unlike the case in Figure 1.a, we assume that the multinational does not possess a vertical chain of production – the firm's production is vertically internalized. Figure 2.b shows the case where non-fragmentation occurs, so that the product is now being exported directly from China instead of Japan. In reality, as in Figure 1.b, the trade flows in this case would entail a decrease in Japanese direct exports to the US and an increase in Chinese exports to the US. However, unlike in the previous case, this case does not lead to any intra-firm trade between Japan and China.[9]

3-2. Do Imports Promote Export?

Besides FDI flows, other factors can affect the trilateral trade relationship. Some studies find that the imports of foreign products with higher quality can force domestic competitors to become more efficient through international competition. MacDonald (1994) finds that US industries' productivity level rose as the import penetration ratio increased.[10] Many studies also find that more efficient firms tend to

[9] The presence of foreign affiliates can also create spillover effects on local exporters. Javorcik (2004) finds evidence for positive spillover effects of foreign affiliates on their local suppliers. Spillovers from foreign affiliates can help local firms not only to improve their productivity level, but also to become competitive exporters in the international markets. In such a case, we can expect an increase in the exports of the FDI-receiving country.

[10] In a more generalized sense, we can also think that competitive pressure can increase the productivity of firms or industries. Galdon-Sanchez and Schmitz (2002) find that competitive pressure in iron-ore

export. Bernard and Jensen (1999) find that both the ex-ante growth rates and the levels of success measures are higher for exporters, i.e., "good firms become exporters." Combining these two findings and applying to our trilateral trade analysis, we can hypothesize that an increase in the exports from a Japanese firm (JPN) to China may lead a Chinese domestic firm (CHN) to become more efficient and start exporting. This case is shown in Figure 3. Although the trade flows look alike to the case in Figure 1.b, this case does not involve any FDI flows.

3-3. Competition or Complements

Lastly, not the least, we can think of a case where Japanese exports to the US and Chinese exports to the US are substitutes. This is highly probable for an industry in which the exports of the two countries are similar in quality (see Figure 4). In this case, head-to-head competition may arise between Japanese and Chinese firms, which can be observed as a negative correlation between Japanese and Chinese exports to the US.

We must also consider that Japanese and Chinese exports to the US could have a complementary relationship if both countries produce intermediate products, and export them to the US market where a firm in the US assembles the final goods using the intermediate products. In this case, we should observe a positive correlation between Japanese and Chinese exports to the US. It is, however, unlikely to find products from two countries to be complements if we use data based on the industry classification as disaggregated as the HS 4-digit level, which we use in our study. Therefore, we should expect to find a negative correlation between Japanese and Chinese exports to the US with an assumption that the competitive effect outweighs the complimentary effect.

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markets led to an increase in US labor productivity.

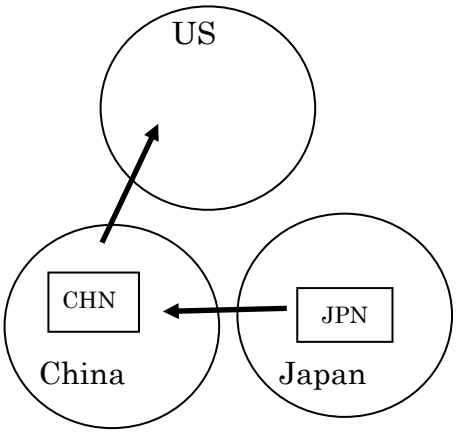

Figure 3: positive spillover effect from imports

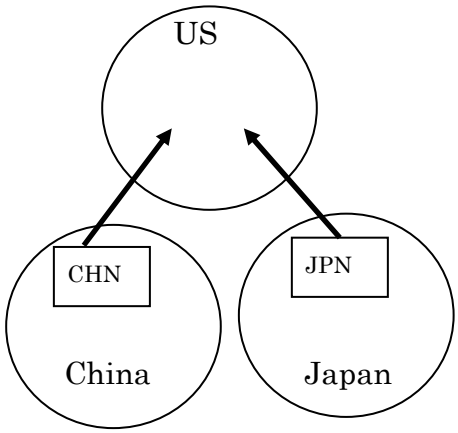

Figure 4: competition (substitutive relationship): negative correlation

3-4. The "Triangular Trade Approach"

The above discussions have shown the complexity of the trade-FDI dynamics, but also demonstrated that we can unravel the complex dynamics by examining the relationships between different flows of trade among the three countries. Figure 5 presents a generic export flow chart among the three countries. The Japanese exports to the US and those to China are denoted as JPNUS and JPNCHN, respectively, while the Chinese exports to the US is denoted as CHNUS.[11]

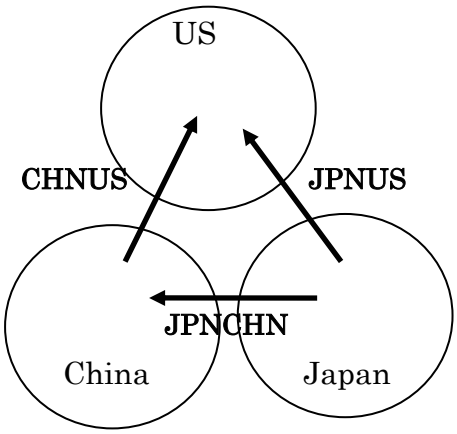

Figure 5: the Triangular Trade Approach

Table 4 summarizes all the scenarios we discussed and expected signs for the correlations between two of the three trade flows. As for the relationship between

[11] For the sake of brevity, we continue to use China as the third country. However, in the empirical analysis section, we will test seven other Asian countries as the third countries.

JPNCHN and CHNUS, we should expect a positive correlation if vertical FDI is made by Japanese firms to China or if Japanese exports to China create spillover effects on Chinese firms and lead them to export to the US. As for the relationship between JPNUS and CHNUS, we should expect a negative correlation if vertical or non-fragmentation FDI is made by Japanese firms to China or if the products from China and Japan are in direct competition in the US market.[12]

Table 4: Expected Signs for the Correlation between Trade Flows

	Expected signs for the correlation between	
	JPNCHN and CHNUS	**JPNUS and CHNUS**
Vertical FDI	positive	negative
Non-fragmentation FDI	–	negative
Imports-Exports	positive	–
Competition	–	positive

In this study, we will employ what we call the "triangular trade approach," in which we will examine the type of trade-FDI dynamics by empirically looking at the correlations between the trade flows in the trilateral trade relationship between Japan, the US, and China (or other Asian "third countries"). More specifically, we will use the export flow from China, or third countries, to the US (CHNUS or THDUS) as the dependent variable in the empirical model while including Japan's exports to China, or the third countries (JPNCHN or JPNTHD) as well as Japan's exports to the US (JPNUS) as explanatory variables. By comparing what we find in the empirical analysis with the theoretical predictions in Table 4, we will conjecture what kind of trade and/or FDI relationship exists between the countries.

4. The Data

The exports data used in this study are extracted at the HS 4-digit level from *International Trade by Commodity Statistics (ITCS), Harmonized System Rev.1,* OECD. At this level of disaggregation, there are 1,367 commodity classifications. From this set of data, we select our sample in the following two steps. First, we remove the

[12] The cells with "–" indicate that there is no specific theoretical prediction for the sign of the correlation.

commodities which have missing values in *any* of the years in our sample period of 1990 through 2000[13]. Second, we need three flows of exports for each of the third countries, that is, Japanese exports to the third country; Japanese exports to the US; and the third country's exports to the US. As such, we restrict our data to only those commodities for which *all of the three* export flows exist. This selection process causes the number of observations to decline considerably and to vary among the third countries depending on data availability. For example, there are 576 commodities for China while there are only 162 commodities for Indonesia.[14]

Annual observations of exchange rate volatility are constructed from monthly exchange rates from IMF's *International Financial Statistics*. Other macroeconomic variables are retrieved from IMF's *IFS* and *Direction of Trade*. We also include the trade intensity indices for each pair of trading countries using the method in Frankel and Rose (1997). More details on the data definitions are given in Appendix 1.

5. Empirical Results with the Base Model

5-1. Model Specification and Empirical Results

First, we specify a general error component regression model for the panel dataset using the first-differenced trilateral trade flows as shown in equation (1).

$$\Delta T_{i,j,t}^{THDUS} = \sum_{i=1}^{I} \alpha_i D^i \Delta T_{i,j,t}^{JPNTHD} + \sum_{i=1}^{I} \beta_i D^i \Delta T_{i,j,t}^{JPNUS} + \sum_{k=1}^{K} \phi_k Z_{i,t}^k + \lambda_{i,j} + \varepsilon_{i,j,t} \quad (1)$$
$$i = 1,...,I;\ \ j(i) = 1,...,J(i);\ \ t = 1,...,T$$

$\Delta T_{i,j,t}^{THDUS}$ is the first-differenced exports of third country i to the US for commodity j at year t, while $\Delta T_{i,j,t}^{JPNTHD}$ and $\Delta T_{i,j,t}^{JPNUS}$ are the first-differenced Japanese exports to the third country and those to the US, respectively. The dummy variable D^i takes a value of unity for country i and zero otherwise, and is also included to allow for

[13] We also restrict our sample to comprise the commodities for which a complete set of observations exists with a strictly positive amount of trade for the entire sample period.

[14] The number of commodities for the third countries are 576 for China, 572 for Korea, 487 for Hong Kong, 288 for Singapore, 310 for Thailand, 162 for Indonesia, 180 for the Philippines, and 218 for Malaysia.

heterogeneous coefficients for the export variables. $Z_{i,t}^{k}$ represents a *k*-th exogenous variable for country *i* at year *t*. $\lambda_{i,j}$ is the individual effect while $\varepsilon_{i,j,t}$ is the disturbance term. We should note that the number of commodities, *J(i)*, varies for each third country *i,* and that we suppress (*i*) for the subscript *j* in the notation.

To select our model specification between random effect and fixed effect models, we use Arellano's (1993) Wald test because it is robust to heteroskedasticity and autocorrelation of the disturbances.[15] If the null hypothesis that the conditional expectation of the unobserved individual effects is zero is rejected, we will use the fixed effect model. Otherwise, we will use the random effect model. If the LM heteroskedasticity test statistics or Bhargava-DW statistics from the within estimation indicate that the disturbances entail heteroskedasticity or serial autocorrelation, we will use the White heterosckedasticity-consistent standard deviations.

5-2. Preliminary Analysis with only Export Variables

First, as a preliminary analysis, we include only the export variables in our panel data estimation as shown in equation (2). Because the robust Arellano statistic is found to be 75.2 and significantly rejects the null hypothesis, we use the fixed effect model. Also, since the LM test statistics indicate that the model specification entails heteroskedasticity and serial correlation, we use the White standard deviations.

$$\Delta T_{i,j,t}^{THDUS} = \sum_{i=1}^{8} \alpha_i D^i \Delta T_{i,j,t}^{JPNTHD} + \sum_{i=1}^{8} \beta_i D^i \Delta T_{i,j,t}^{JPNUS} + \lambda_{i,j} + \varepsilon_{i,j,t} \qquad (2)$$
$$i = 1,...,8; \;\; j(i) = 1,...,J(i); \quad t = 1,...,10$$

Table 5 reports the estimation results. The estimated coefficients of Japanese exports to third countries (JPNTHD), are always positive. While the magnitude of the coefficients varies among the third countries, it is especially higher for Korea (0.30), Singapore (0.32), and Malaysia (0.73), more than tenfold of the coefficients for Hong Kong, Thailand, and Indonesia. However, we obtained statistically significant

[15] While many researcher use the Hausman (1978) method which employs both GLS and within estimators for the specification test on random effects, Hausman and Taylor (1981) show that alternative test statistics incorporating the between estimators are also numerically identical. However, these tests are no longer valid if the disturbances are heteroskedastic and/or serially correlated, which we suspect in our data. For the summary of Hausman's specification test, see Baltagi (2001). Also, see Ahn and Low (1996) and Baltagi et al. (2003) for recent developments of the specification tests.

coefficients only for China, Korea, and Malaysia.

This preliminary analysis shows that Japan's exports to some of the Asian countries are positively correlated with their exports to the US. In section 3, we discussed a possibility of technology transfer from an exporting country to an importing country. However, we should not exclude a possibility of FDI affecting the correlations as we discussed in section 3.

Our previous discussion suggests that the expected sign for the coefficient of JPNUS (Japanese exports to the US) can be negative in the following two cases. First, the correlation between Japan's and a third country's exports to the US can be negative when the two countries' exports are competing head-to-head in US markets. Second, when Japanese companies are shifting their production bases from Japan to their subsidiaries in the third country, which inevitably involves FDI by the parent firms, their direct exports from Japan to the US can be replaced with those from the third country (i.e., a negative correlation). However, we must also note that the sign can be positive when some common factors, such as high US economic growth, are causing both flows of exports to increase.

Interestingly, the estimated coefficient of JPNUS is significantly negative only for China (–0.05). We can surmise that this is either because Japanese and Chinese exporters competing head-to-head or because Japanese multinational corporations are shifting their production bases from Japan to China through FDI. However, we cannot yet tell which hypothesis is applicable.

5-3. Analysis with Country Characteristics as Explanatory Variables

In this section, following the gravity model literature, we include macroeconomic variables in addition to JPNTHD and JPNUS. After dropping some of the variables that appeared to cause multicollinearity, we decided to include 10 macro variables in $Z_{i,t}$ (equation (1)).[16]

Past empirical studies on bilateral trade relationships suggest the effects of macro control variables as follows. The inflation rate in a third country is expected to be negatively correlated to the country's exports to the US because of an increase in the

[16] These variables are exchange rate volatility (EXVOL_US), inflation rate of the third countries (INF_THD), US inflation rate (INF_US), nominal GDP of the third countries (NY_THD), US nominal GDP (NY_US), Japanese nominal GDP (NY_JPN), third countries' imports from the world (W_IMP_THD), Japanese imports from the world (W_IMP_JPN), third countries' exports to the world (W_EXP_THD), and US exports to the world (W_EXP_US).

overall costs in the third country. While US nominal GDP should be positively correlated with third countries' exports to the US, the effect of Japan's nominal GDP on third countries' exports to the US depends on whether the exports from Japan and the third countries are complements or substitutes. An increase in Japan's nominal GDP can be positively (but indirectly) correlated with a third country's exports to the US if the exports from the third country and Japan are complements, but negatively if they are substitutes. Other Japan-related macroeconomic variables are difficult to make a priori assumptions here. We will come back to this issue when we examine the empirical results.

Table 6 shows the estimation results from the analysis with macroeconomic variables. Unlike past findings in the literature, most of the macroeconomic variables are insignificant. Moreover, the estimated coefficients for JPNTHD and JPNUS are unaffected while the adjusted R-squared barely improve. We suspect that the reason why these macroeconomic variables do not improve the estimation is because some of the variables take only a small number of different values while trade-related data vary depending on the third country (i) and the commodity (j). For example, there are only 10 different (i.e., annual) values for US nominal GDP in a sample of 27,930 observations.[17] As such, we need to employ some other data that entail more variation.

6. Empirical Results with More Disaggregated Explanatory Variables

Given the above discussion, we reestimate our model using more disaggregated data for the control variables. Instead of the macroeconomic variables, we include US total imports on commodity basis (i.e., disaggregated at the HS 4-digit level) to control for changes in US demand for each commodity, and Japanese FDI (at the HS 2-digit level) to capture some possible production shift by Japanese multinational corporations.

6-1. Data Construction

For the variable on US disaggregated imports, we use the same dataset OECD's from *ITCS* and call it USMAR.[18] We hope that this variable will proxy actual expenditure allocated for each imported commodity. Unlike the macroeconomic variables, this variable takes as many different values as the dependent variable.

[17] The explanatory power of macroeconomic variables in the past bilateral trade studies hinges on the use of aggregated trade data.
[18] Like other trade-related variables, we include USMAR as the first differenced variable.

Given our suspicion in the previous analysis that the estimated coefficient of JPNTHD may have reflected the effect of Japanese FDI flows to the third countries, we include a variable that specifically refers to Japanese FDI to the third countries. For this variable, we use the data from the *Overseas Japanese Companies Data* (*OJCD*) from Toyo Keizai. OJCD contains the information for approximately 19,000 Japanese overseas subsidiaries, categorized in 68 industry classifications (which do not correspond to HS industry classifications), including each subsidiary's established year, location, business objectives, industry classification, and other relevant information. Among the 68 industries, we exclude those industries which do not actively engage in goods trade such as real estate and banking sectors. Then, we reallocate OJCD's codes to corresponding HS 2-digit codes and reclassify the data to create the FDI data based on the HS classifications.[19] The new variable counts as Japanese FDI in the Asian third countries the number of the subsidiaries established by Japanese firms for each host country, year, and HS 2-digit industry code.[20]

6-2. Estimation Results

With these two additional variables, our estimation model becomes:

$$\Delta T_{i,j,t}^{THDUS} = \sum_{i=1}^{8} \alpha_i D^i \Delta T_{i,j,t}^{JPNTHD} + \sum_{i=1}^{8} \beta_i D^i \Delta T_{i,j,t}^{JPNUS} + \sum_{i=1}^{8} \delta_i D^i FDI_{i,j,t} + \sum_{i=1}^{8} \gamma_i D^i USMAR_{i,j,t} + \lambda_{i,j} + \varepsilon_{i,j,t} \quad . \quad (3)$$
$$i = 1,...,8; \; j(i) = 1,...,J(i); \; t = 1,...,10$$

The estimation results are shown in Table 7. As for the US disaggregated import variables, USMAR, many of the coefficients are significantly positive. Among the Japanese FDI variables, the coefficient is significantly positive only for China, indicating that Japanese multinationals' FDI to China complements Chinese exports to the US. Interestingly, with this model specification, the estimated coefficient for the Japanese exports to China is no longer significant, a stark contrast with the previous analysis where Japanese exports to China appeared to be promoting Chinese exports to

[19] The concordance table is available from authors upon request. When a particular OJCD code covers more than two HS 2-digit codes, the FDI data for this OJCD code is counted in all corresponding HS 2-digit codes.

[20] Therefore, two different HS 4-digit codes with the same first two digits share the same number of accumulated Japanese affiliated firms. This may not be problematic as long as there is cross-industry effect within the HS 2-digit level since we are trying to capture the trade-promoting effect of FDI.

the US. Given this and the previous results, we can surmise that Chinese exports to the US grow only through relocation of Japanese production plants to China (implemented through FDI), not from indirect technology transfer through Japanese exports.

The triangular trade relationships involving Korea and Indonesia cast an interesting contrast to the case with China. The coefficients of the Japanese exports variables to these two countries remain significant at the five percent significance level while the coefficients of the FDI variables are not significant. This means that for Korea and Indonesia, Japanese exports to these countries are positively correlated with their exports to the US while Japanese FDI does not seem to play any important role in promoting these countries' exports to the US. The positive coefficients for the Japanese exports to Korea and Indonesia can be attributed to technology transfer or competitive pressure from Japanese exports to these countries.

In contrast to the previous results shown in Table 5, the coefficients of JPNUS are also significantly negative for not only China but also Indonesia and the Philippines. Moreover, the Korean coefficient for JPNUS, which was significantly positive in the previous estimation, is no longer significant. We believe that including the USMAR variable eliminates the positive income effect of US market growth from JPNUS. It is noteworthy that the absolute value of JPNUS's coefficient for China is much larger than that of Indonesia or the Philippines. Therefore, we can conclude that the degree of competition with Japanese products in US markets is much higher for Chinese exports than the other countries'.[21]

7. Conclusions

In our empirical exploration, we found that the exports of China and those of Japan are directly competiting in US markets while the former also seems to be promoted partly by Japanese exports to China. However, after controlling for Japan's FDI to China (at the industry level), the trade enhancing effect of Japanese exports disappears. With a statistically significant coefficient for Japanese FDI to China, we can conclude that Japanese exports to China promote Chinese exports to the US because of increasing vertical trade between Japanese multinationals and their affiliates in China. The combined evidence of the substitutive relationship between Chinese and Japanese exports to the US and the export-promoting effect of Japanese FDI to China confirms a view that, while Chinese exports compete vigorously with Japanese exports in US

[21] We also investigated equation (3) with the macroeconomic variables and found the results qualitatively unchanged. However, the Chinese coefficient for the FDI variable becomes statistically insignificant, though its *p*-value is about 14.8%. The estimation results are available upon request.

markets, Japanese multinationals are shifting production bases to China as part of their global production network.

Our results for other Asian countries show that Indonesian and Philippine exports are also competing with Japanese exports in US markets. However, the degree of the competition with Japanese exports is found to be much higher for China. Also, the coefficients for Japanese FDI to these countries are found to be positive, but insignificant, indicating that Japanese FDI to these countries is not promoting the countries' exports to the US. Thus, the export-platform FDI for the US market per se is only applicable to China, but not to other Asian countries, a finding consistent with Markusen and Maskus (2002).

Our study shed light on the current debate about the trade disputes between China and the US from a different angle and presented results that may involve political ramifications. The main finding from our empirical analysis suggests that a surge in Chinese exports to the US may involve quite a few products manufactured by Japanese affiliates in China and therefore may simply reflect change in Japanese multinational corporations' strategy in global production. With the general perception of Chinese exports "threatening" US industry, we will probably continue to see more cases against China brought into the WTO, but likely including the ones that actually involves products of Japanese multinational corporations.

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Appendix 1:

exvol_US = exchange volatility between THD's currency and the U.S. dollars

exvol_JPN = exchange volatility between THD's currency and Japanese yen

inf_THD = THD's inflation rate

inf_US = US inflation rate

inf_JPN = Japanese inflation rate

rypc_THD = real GDP per capita of THD

rypc_US = real GDP per capita of US

rypc_JPN = real GDP per capita of Japan

ny_THD = nominal GDP of THD

ny_US = nominal GDP of US

ny_JPN == nominal GDP of Japan

W_IMP_THD = THD's imports from the world

W_IMP_US = US imports from the world

W_IMP_JPN = Japanese imports from the world

W_EXP_THD = THD's exports to the world

W_EXP_US = US exports to the world

W_EXP_JPN = Japanese exports to the world

Appendix2: Concordance Table for FDI and Trade Classification

HS Code	Toyo Keizai Code				HS Code	Toyo Keizai Code			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th
1					53	700	2700		
3	200	600	2600		54	700	2700		
5	200	600	2600		55	700	2700		
6	200	2600			56	700	2700		
7	200	600	2600		57	700	2700		
9	200	600	2600		58	700	2700		
10	200	600	2600		59	700	2700		
11	200	600	2600		60	700	2700		
12	200	600	2600		61	700	2700		
13	200	600	2600		62	700	2700		
14	200	600	2600		63	700	2700		
15	200	600	2600		64				
16	600				65				
17	600				66				
18	600				67				
19	600				68	1400	3200		
20	600				69	1400	3200		
21	600				70	1400	3200		
22	600				71				
23	600				72	1500	3300		
24					73	1500	3300		
25	300				74	1600	1700	3400	3500
26	300				75	1600	1700	3400	3500
27	300	1200	3000		76	1600	1700	3400	3500
28	1100	2900			78	1600	1700	3400	3500
29	1100	2900			79	1600	1700	3400	3500
30	1100	2900			80	1600	1700	3400	3500
31	1100	2900			81	1600	1700	3400	3500
32	1100	2900			82	1600	1700	3400	3500
33	1100	2900			83	1600	1700	3400	3500
34	1100	2900			84	1800	3600		
35	1100	2900			85	1900	3700		
36	1100	2900			86	2000	3800		
37	1100	2900			87	2100	3900		
38	1100	2900			88	2000	3800		
39	1100	2900			89	2000	3800		
40	1300	3100			90	2200	4000		
41	1300	3100			91	2200	4000		
42	1300	3100			92	2300			
44	800	2800			93				
46	800	2800			94				
48	900	2800			95				
49	1000				96				
50	700	2700			97				
51	700	2700							
52	700	2700							

Table 1: China's Trade with Major Trading Partners

(thousands of dollars)

Imports

	1992		1995		1998		2000	
1	Hong Kong	20,533,589	Japan	29,004,529	Japan	28,275,074	Japan	41,509,675
2	Japan	13,682,461	United States	16,118,291	United States	16,883,171	Taiwan	25,493,561
3	United States	8,900,735	Taiwan	14,783,944	Taiwan	16,631,051	Korea	23,207,406
4	Taiwan	5,865,971	Korea	10,293,234	Korea	15,014,348	United States	22,363,148
5	Germany	4,015,042	Hong Kong	8,590,713	Germany	7,020,657	Germany	10,408,731
	World	80,585,333	World	132,083,539	World	140,236,807	World	225,093,731

Exports

	1992		1995		1998		2000	
1	Hong Kong	37,512,229	Hong Kong	35,983,427	Hong Kong	38,741,792	United States	52,099,220
2	Japan	11,678,713	Japan	28,466,685	United States	37,947,666	Hong Kong	44,518,285
3	United States	8,593,800	United States	24,713,498	Japan	29,660,114	Japan	41,654,314
4	Germany	2,447,990	Korea	6,687,805	Germany	7,354,309	Korea	11,292,364
5	Korea	2,404,912	Germany	5,671,451	Korea	6,251,516	Germany	9,277,790
	World	84,940,062	World	148,779,565	World	183,809,065	World	249,202,551

Source: ITCS,OECD

Table 2: Shares of Trade with Japan and the US among the Asian countries

Exporting Country

	1990		1995		2000	
	Japan	US	Japan	US	Japan	US
China	0.15	0.08	0.19	0.17	0.17	0.21
Korea	0.19	0.29	0.13	0.19	0.12	0.22
Hong Kong	0.06	0.24	0.06	0.22	0.06	0.23
Singapore	0.09	0.21	0.08	0.18	0.08	0.17
Thailand	0.17	0.23	0.17	0.18	0.15	0.21
Indonesia	0.43	0.13	0.27	0.14	0.23	0.14
Philippine	0.20	0.38	0.16	0.36	0.15	0.30
Malaysia	0.15	0.17	0.12	0.21	0.13	0.21

Importing Country

	1990		1995		2000	
	Japan	US	Japan	US	Japan	US
China	0.14	0.12	0.22	0.12	0.18	0.10
Korea	0.25	0.23	0.24	0.23	0.20	0.18
Hong Kong	0.16	0.08	0.15	0.08	0.12	0.07
Singapore	0.20	0.16	0.21	0.15	0.17	0.15
Thailand	0.30	0.11	0.29	0.12	0.25	0.12
Indonesia	0.25	0.11	0.23	0.12	0.16	0.10
Philippine	0.18	0.20	0.22	0.18	0.19	0.17
Malaysia	0.24	0.17	0.27	0.16	0.21	0.17

Source: *Direction of Trade*, IMF

Table3 : Japanese Foreign Direct Investment to the Asia countries (1989 - 2002)

(100 million Yen)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
China	587	511	787	1,381	1,954	2,683	4,319	2,828	2,438	1,377	849	1,112	1,808	2,152
	(126)	(165)	(246)	(490)	(700)	(636)	(770)	(365)	(258)	(114)	(78)	(105)	(189)	(263)
Korea	799	419	357	291	289	420	433	468	543	389	1,094	899	704	763
	(81)	(54)	(48)	(28)	(34)	(27)	(25)	(33)	(53)	(48)	(62)	(52)	(47)	(44)
Hong Kong	2,502	2,610	1,260	966	1,447	1,179	1,106	1,675	860	789	1,088	1,039	374	248
	(335)	(244)	(178)	(154)	(184)	(112)	(119)	(89)	(121)	(51)	(76)	(52)	(37)	(31)
Singapore	2,573	1,232	837	875	735	1,101	1,143	1,256	2,238	832	1,102	505	1,433	915
	(181)	(139)	(103)	(100)	(97)	(69)	(94)	(102)	(96)	(58)	(51)	(25)	(31)	(34)
Thailand	1,703	1,696	1,107	849	680	749	1,196	1,581	2,291	1,760	924	1,030	1,105	614
	(403)	(377)	(258)	(130)	(127)	(126)	(147)	(196)	(154)	(72)	(72)	(62)	(51)	(52)
Indonesia	840	1,615	1,628	2,142	952	1,808	1,548	2,720	3,085	1,398	1,024	464	622	509
	(140)	(155)	(148)	(122)	(115)	(116)	(168)	(160)	(170)	(64)	(57)	(26)	(56)	(41)
Philippine	269	383	277	210	236	683	692	630	642	488	689	514	951	500
	(87)	(58)	(42)	(45)	(56)	(75)	(100)	(75)	(64)	(46)	(32)	(44)	(25)	(20)
Malaysia	902	1,067	1,202	919	892	772	555	644	971	668	588	256	320	98
	(159)	(169)	(136)	(111)	(92)	(51)	(57)	(69)	(82)	(34)	(44)	(23)	(18)	(11)
World	90,339	83,527	56,862	44,313	41,514	42,808	49,568	54,095	66,236	52,413	74,703	53,854	39,922	44,175
	(6589)	(5863)	(4564)	(3741)	(3488)	(2478)	(2863)	(2501)	(2495)	(1616)	(1729)	(1701)	(1768)	(2144)

Source: *Outward Direct Investment*, Ministry of Finance, Japan. Figures in parentheses indicates the number of FDI cases.

Table 5: Within Estimates from the Triangular Trade Regression

Dependent variable: (first-differenced) exports of third countries to the US

Variable	Coefficient	Variable	Coefficient
JPNCHN	0.125**	JPNUS(CHN)	-0.048*
	(0.063)		(0.028)
JPNKOR	0.301**	JPNUS(KOR)	0.215***
	(0.122)		(0.069)
JPNHKG	0.071	JPNUS(HKG)	0.022
	(0.068)		(0.016)
JPNSGP	0.319	JPNUS(SGP)	0.082
	(0.246)		(0.098)
JPNTHA	0.006	JPNUS(THA)	0.024
	(0.035)		(0.015)
JPNIDN	0.024	JPNUS(IDN)	-0.004
	(0.017)		(0.006)
JPNPHL	0.161	JPNUS(PHL)	-0.024
	(0.369)		(0.023)
JPNMAL	0.732***	JPNUS(MAL)	0.053
	(0.245)		(0.040)

NOB= 27930 Adj. R2 = 0.350

Note: All trade-related variables are included as first-differenced variables. White heteroskedasticity consistent standard deviations are in parentheses. ***, **, and * denote significance at 1, 5, and 10 percent levels, respectively. The number of commodities for each country differs due to screening process by our own selection criteria, see section 4 for further details; 576 for China, 572 for Korea, 487 for Hong Kong, 288 for Singapore, 310 for Thailand, 162 for Indonesia, 180 for Philippine, and 218 for Malaysia.

Table 6: Within Estimates for the Triangular Trade Regression with Macro Variables

Dependent variable: (first-differenced) exports of third countries to the US

Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
JPNCHN	0.109*	JPNUS(CHN)	-0.049*	EXVOL_US	-6,347
	(0.063)		(0.028)		(9,781)
JPNKOR	0.299**	JPNUS(KOR)	0.215***	INF_THD	-0.631
	(0.124)		(0.069)		(52)
JPNHKG	0.074	JPNUS(HKG)	0.023	INF_US	457
	(0.069)		(0.016)		(1,118)
JPNSGP	0.319	JPNUS(SGP)	0.082	NY_THD	-0.016
	(0.246)		(0.098)		(0.012)
JPNTHA	0.018	JPNUS(THA)	0.024	NY_US	0.007
	(0.036)		(0.015)		(0.005)
JPNIDN	0.031*	JPNUS(IDN)	-0.003	NY_JPN	-0.002
	(0.018)		(0.006)		(0.002)
JPNPHL	0.171	JPNUS(PHL)	-0.022	W_IMP_THD	0.069**
	(0.367)		(0.022)		(0.032)
JPNMAL	0.733***	JPNUS(MAL)	0.052	W_IMP_JPN	-0.055
	(0.245)		(0.040)		(0.044)
				W_EXP_THD	0.251***
					(0.061)
				W_EXP_US	-0.011
					(0.030)

NOB = 27930 Adj. R2 = 0.351

Note: All trade-related variables are included as first-differenced variables. White heteroskedasticity consistent standard deviations are in parentheses. ***, **, and * denote significance at 1, 5, and 10 percent level, respectively. The number of commodities for each country differs due to screening process by our own selection criteria, see section 4 for further details; 576 for China, 572 for Korea, 487 for Hong Kong, 288 for Singapore, 310 for Thailand, 162 for Indonesia, 180 for Philippine, and 218 for Malaysia.

Table 7: Within Estimates from the Triangular Trade Regression with FDI and US Market Size

Dependent variable: (first-differenced) exports of third countries to the US

Variable	Coefficient	Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
JPNCHN	0.038	JPNUS(CHN)	-0.141***	FDICHN	51.358***	USMAR(CHN)	0.052***
	(0.067)		(0.044)		(15)		(0.016)
JPNKOR	0.202**	JPNUS(KOR)	0.055	FDIKOR	-531.120	USMAR(KOR)	0.093***
	(0.095)		(0.050)		(522)		(0.024)
JPNHKG	0.048	JPNUS(HKG)	0.012	FDIHKG	-42.172	USMAR(HKG)	0.006
	(0.069)		(0.012)		(54)		(0.004)
JPNSGP	0.263	JPNUS(SGP)	0.063	FDISGP	-107.803	USMAR(SGP)	0.017
	(0.224)		(0.110)		(231)		(0.016)
JPNTHA	-0.002	JPNUS(THA)	0.013	FDITHA	-27.908	USMAR(THA)	0.006
	(0.031)		(0.019)		(23)		(0.005)
JPNIDN	0.026**	JPNUS(IDN)	-0.020***	FDIIDN	-76.020	USMAR(IDN)	0.008***
	(0.011)		(0.008)		(72)		(0.003)
JPNPHL	-0.003	JPNUS(PHL)	-0.083***	FDIPHL	90.768	USMAR(PHL)	0.031**
	(0.345)		(0.032)		(175)		(0.013)
JPNMAL	0.440**	JPNUS(MAL)	-0.041	FDIMAL	-647.534***	USMAR(MAL)	0.068***
	(0.224)		(0.042)		(212)		(0.022)

NOB = 27930 Adj.R2 = 0.445

Note: All trade-related variables are included as first-differenced variables. White heteroskedasticity consistent standard deviations are in parentheses. ***, **, and * denote significance at 1, 5, and 10 percent levels respectively. The number of commodities for each country differs due to screening process by our own selection criteria, see section 4 for further details; 576 for China, 572 for Korea, 487 for Hong Kong, 288 for Singapore, 310 for Thailand, 162 for Indonesia, 180 for Philippine, and 218 for Malaysia.